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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/808,189

03/24/2004

Kie Ahn

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EXAMINER

PHAM, LONG

ART UNIT

PAPER NUMBER

2814

MAIL DATE

DELIVERY MODE

07/27/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/808,189	<b>Applicant(s)</b> AHN ET AL.	
	<b>Examiner</b> Long Pham	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-45 and 88-107 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2,27 and 88-107 is/are allowed.
- 6) ☒ Claim(s) 1,3-26 and 28-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>01/29/07</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### Rejections and/or objections as previously applied

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 5, 12-16, 17, 18, 19, 23, 24, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Park et al. (US publication 2001/0024860).

With respect to claims 1 and 18, Park et al. teach a aluminum oxide layer having a surface that has silicon or dopant material filled pores or voids. See [0019].

Further with respect to claims 1 and 18, Park et al. further teach all formations of dopant material that extend below the surface are exposed at the surface. See [0019].

With respect to claim 3, the process and/or product-by-process limitation “wherein the aluminum oxide layer is formed by a method .... Ion-beam-assisted deposition” has not been given patentable weight in present device claim.

With respect to claim 4, the product-by-process and/or process limitation “wherein a degree of porosity of the aluminum oxide layer... and plasma activation” has not been given patentable weight in present device claim.

Art Unit: 2814

With respect to claim 5, the product-by-process and/or process limitation "wherein a degree of porosity of the aluminum oxide layer... with oxygen ions during formation" has not been given patentable weight in present device claim.

With respect to claims 12-16, the limitations recited therein are process and/or product-by-process limitations and have not been given patentable weight.

With respect to claims 17 and 25, Park et al. teach that the thickness of dopant material is less than or equal the diameter of the pores or voids.

Further with respect to claim 18, the process limitation "wherein the aluminum oxide layer ... physical vapor deposition techniques" has not been given patentable weight in present device claim.

With respect to claims 19, 23, and 24, the limitations recited therein are process and/or product-by-process limitations and have not been given patentable weight.

Claims 26, 28-30, 37-40, and 42 are rejected under 35 U.S.C. 102(e) as being anticipated by Weldon et al. (US publication 2004/0190215).

With respect to claim 26, Weldon et al. teach a dielectric layer comprising a aluminum oxide layer having dielectric material or titanium oxide embedded pores.

Further with respect to claim 26, Park et al. further teach all formations of dopant material that extend below the surface are exposed at the surface. See [0019].

Further with respect to claim 26, the process or product-by-process limitation "wherein the dopant material is embedded in the pores of the aluminum oxide layer ... of an oxide form and nitride form" has not been given patentable weight.

Further with respect to claim 26, Weldon et al. further teach that the dopant material or titanium oxide is not dispersed throughout the aluminum oxide layer.

Art Unit: 2814

With respect to claims 28-30 and 37-40, the limitations recited therein are product-by-process and/or process limitations and have not been given patentable weight.

With respect to claim 42, Park et al. teach that the thickness of dopant material is less than or equal the diameter of the pores or voids.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-7, 8-11, 20, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US publication 2001/0024860).

With respect to claims 6, 7, and 20, Park et al. fail to teach the ranges for the packing density of the aluminum oxide layer.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal values or ranges for the packing density of the aluminum oxide layer through routine experimentation and optimization to obtain optimal or desired device performance because it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claims 8-11 and 21-22, Park et al. fail to teach the ranges for the dopant material weight.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal values or ranges for the dopant material weight through routine experimentation and optimization to obtain optimal or desired device performance because it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

Claims 31-32, 33-36, 41, and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weldon et al. (US publication 2004/0190215).

With respect to claims 31-32, Park et al. fail to teach the ranges for the packing density of the aluminum oxide layer.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal values or ranges for the packing density of the aluminum oxide layer through routine experimentation and optimization to obtain optimal or desired device performance because it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claims 33-36, Park et al. fail to teach the ranges for the dopant material weight.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal values or ranges for the dopant material weight through routine experimentation and optimization to obtain optimal or desired device performance because it has been held that it is not inventive to discover the optimum or workable ranges of a result-

Art Unit: 2814

effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claim 41, the limitation recited therein is produc-by-proces and/or process limitation and has not been given patentable weight.

With respect to claims 43, 44, and 45, Weldon et al. fail to teach using the dielectric layer as a gate dielectric of a MOS or floating gate MOS and a dielectric of a capacitor.

However, the use of dielectric as gate dielectric or capacitor dielectric is well-known.

### ***Response to Arguments***

Applicant's arguments filed 04/23/07 have been fully considered but they are not persuasive. See below.

In response to the applicant's arguments in the paragraph in the middle of page 2 of the response dated 04/2/07, it is submitted that claims 1 and 18 do not require the pores are filled with all elements silicon, zirconium, hafnum, and titanium.

In response to the applicant's arguments in the paragraph at the bottom of page 2 of the response dated 04/2/07, it is submitted that claims require the formation to be exposed at the surface not the dopant material.

In response to the applicant's arguments in the paragraph at the bottom of page 2 of the response dated 04/2/07, it is submitted that limitations not recited in present claims have not been considered.

In response to the applicant's arguments in the paragraph at the bottom of page 2 of the response dated 04/2/07, it is submitted that the process limitations have not been given patentable weight unless they produce structural or material differences.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on Mon-Frid, 10am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

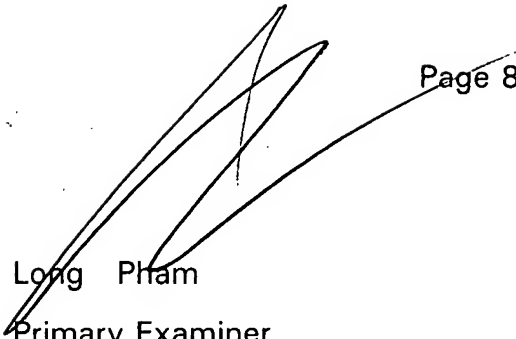
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Application/Control Number: 10/808,189

Art Unit: 2814

Page 8



Long Pham

Primary Examiner

Art Unit 2814

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